MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAM

TRIMESTER 1, 2016/2017 SESSION

TCE 2311 – DATA COMMUNICATIONS AND NETWORKING

(All Sections / Groups)

21 OCT 2016
3:00 p.m – 5:00 p.m
(2 Hours)

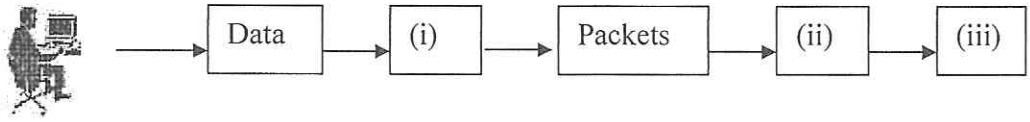
INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 6 printed pages including cover page with 6 questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of marks for each question is given.

3. Please write all your answers in the Answer Booklet provided

Question 1



The Data Encapsulation process is as illustrated above.

a) Name (i), (ii) and (iii). (3 marks)
b) What kind of address information can be found in (i)? (1 mark)
c) Which internetworking device handles packet delivery? Name the OSI layer that is responsible for packet delivery. (2 marks)
d) Which PC hardware stores the address information found in (ii)? What is the function of this address? What is the command used to find the address on a windows PC? (3 marks)
e) Name the internetworking device that is used to handle bit delivery. (1 mark)

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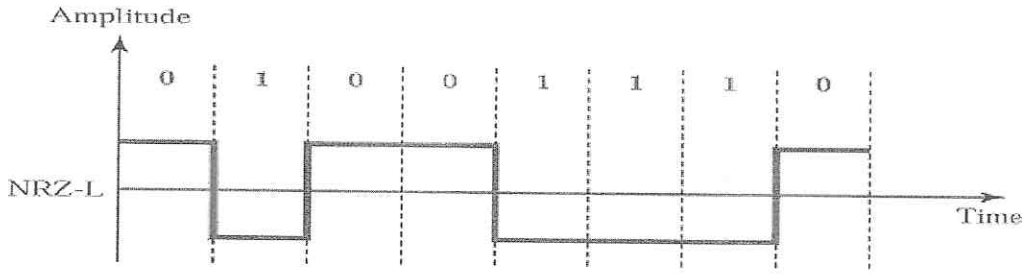
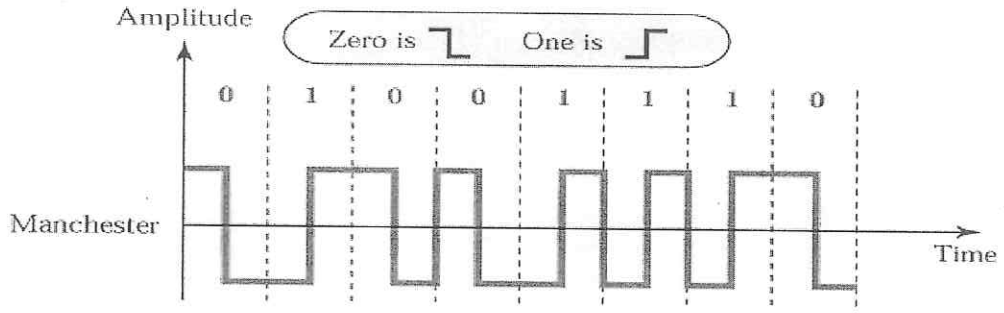
Question 2



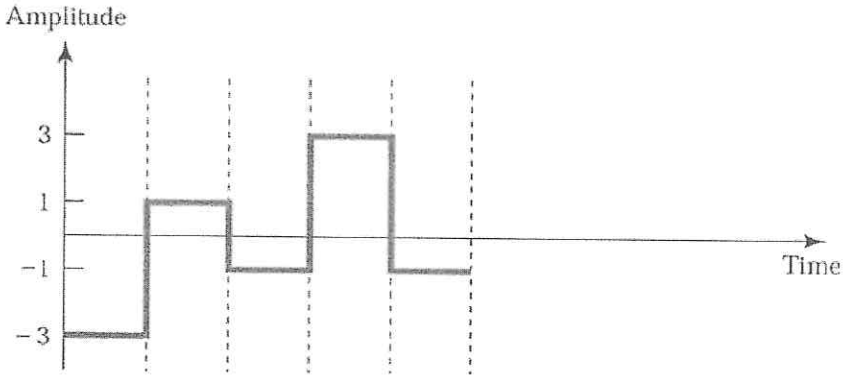
The figure above shows a polar encoding scheme, NRZ-L.

a) What is the polar encoding scheme? (1 mark)
b) Why is this encoding called NRZ (non-return to zero)? (1 mark)
c) This encoding scheme has two problems. Briefly explain them. (4 marks)



The figure above shows another polar encoding scheme, Manchester.

d) Why Manchester encoding has a better synchronization than NRZ-L? (1 mark)



The above figure shows 2B1Q encoding.

e) Four voltage levels are needed for 2B1Q encoding. So, how many bits are carried per time interval? Show your steps. (2 marks)
f) Why is 2B1Q more efficient than NRZ-L and Manchester encoding? (1 mark)

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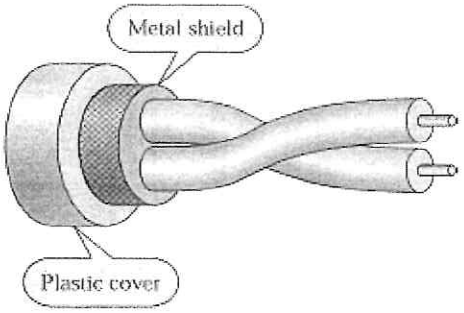
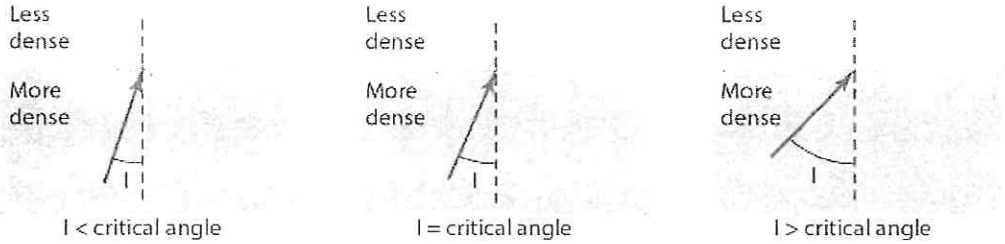
Question 3



A shielded twisted pair (STP) cable is a shown in the above figure.

a) What is the function of the metal shield? (1 mark)
b) State a disadvantage of using STP cables as compared with UTP cables. (1 mark)
c) 100BaseT uses twisted pair cables. State two pieces of information you can get from this cable specification. (2 marks)
d) Name the connector of STP cables. (1 mark)



As shown in the figure above, a light ray travels into substances with different density.

e) What will happen to the light ray if
   i) I < critical angle
   ii) I = critical angle
   iii) I > critical angle (3 marks)
f) Which one, (i), (ii) or (iii), has to be achieved when using fiber optic to transmit data? Why? (2 marks)

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Question 4

11011110 11111100 11110000 11000110

a) A computer received the data as above. Using simple parity check (even), decide whether or not the data is corrupted. (1 mark)
b) What will the computer do if the data sent is corrupted? (1 mark)
c) Can simple parity check detects multiple-bit errors? (1 mark)
d) Use two-dimensional parity check (even), arrange the data above in a table and generate parity bits. Show your steps. (2 marks)
e) Can two-dimensional parity check detects multiple-bit errors? (1 mark)
f) Under what circumstance two-dimensional parity check is not able to detect bit errors? (2 marks)
g) Use an algebraic polynomial to represent the following divisor in the CRC generator. (1 mark)
1011
h) Explain the concept of redundancy for detecting errors detection in data communication. (1 mark)

Question 5

a) What are the two differences between a circuit switching and packet switching? Explain using their data forms and communication sharing. (4 marks)
b) Name two approaches used by packet switching. (2 marks)
c) What is the function of virtual circuit identifiers in a virtual circuit wide area network? (1 mark)
d) Briefly explain three phases of communication in a virtual circuit wide area network. (3 marks)

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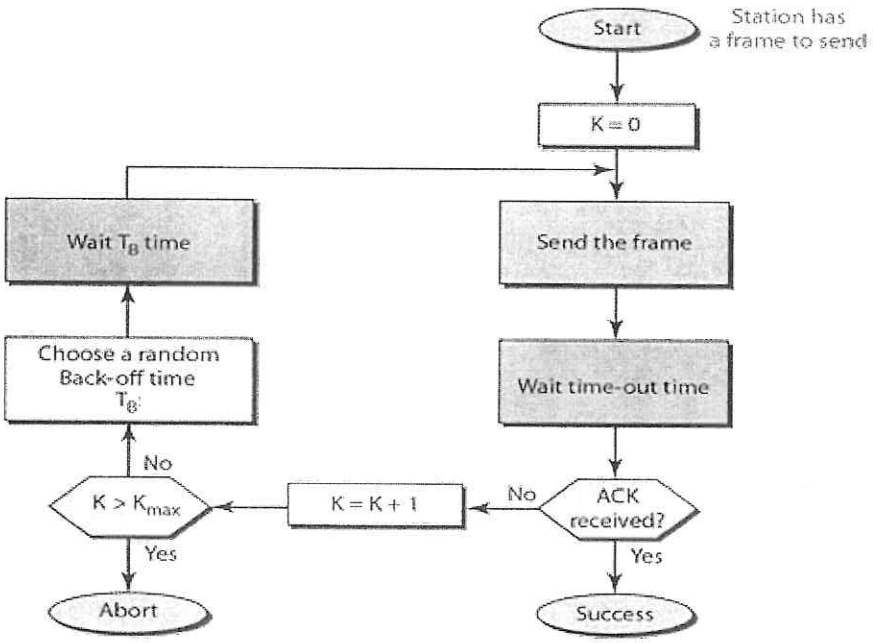
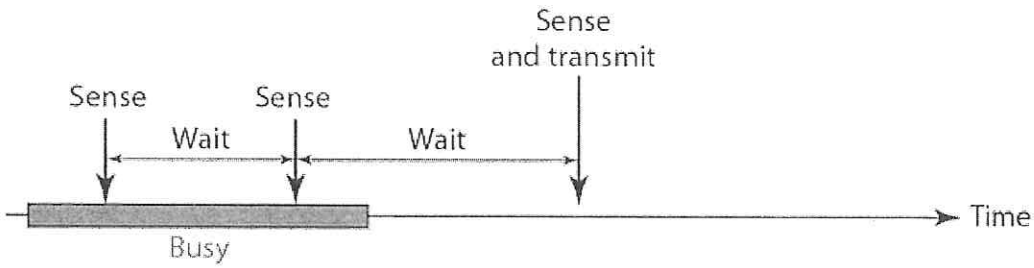
Question 6



The procedure for multiple access (MA) is as shown above.

a) What will happen if the acknowledgement does not arrive after a time-out period? (2 marks)
b) How to avoid network congestion due to retransmission of frames? (1 mark)
c) Fill in the blank. The MA was evolved from a protocol named _____? (1 mark)
d) To further reduce the chances of collisions, Carrier Sense Multiple Access (CSMA) was developed. Briefly explain how CSMA reduce the possibility of collision. Can CSMA eliminate the collision problem? (2 marks)
e) Name two strategies that define the procedures for a station that senses a busy medium. (2 marks)



f) A persistent strategy is as shown above. Explain whether or not this strategy is efficient. (2 marks)

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